1. SCOPE

1.1. The State of Tennessee, Tennessee Department of Transportation (TDOT) has existing Field Surveying equipment consisting of Topcon GR-3, Topcon GR-5, Topcon GRS-1, Topcon GPT-9003A, Topcon GPT-7503, and Topcon IS Imaging Stations. Additionally, TDOT has existing Topcon software systems that are distributed across Tennessee and Regional Survey offices.

1.2. This specification establishes the technical requirements for the replacement of existing Topcon GNSS (Survey-Grade) hardware & software, including Training, Maintenance, Warranty, and Delivery.

1.3. The State of Tennessee plans to purchase hardware and software that will seamlessly connect to the existing Topcon Hardware listed above. Additionally, the State of Tennessee plans to purchase field and office GNSS hardware and software. This purchase will establish specifications for Hardware, Software, Training, Maintenance, Warranty, and Delivery of purchased items. The State may purchase the items in any of the following methods:

1.3.1. Data Collector Option 1 - Carlson Surveyor + Data Collector with SurvCE Software, Topcon FC-250 with Magnet Field Software, or equivalent (ITB Line Item 1000158188)

1.3.2. Data Collector Option 2 - Carlson Mini 2 Data Collector with SurvCE Software, Topcon FC-336 with Magnet Field Software, or equivalent (ITB Line Item 1000166070)

1.3.3. Data Collector Option 3 - Carlson Supervisor Data Collector with SurvCE Software, Topcon Tesla with Magnet Field Software, or equivalent (ITB Line Item 1000166071)

1.3.4. Office Processing Software - Carlson Survey GNSS Software and Carlson Civil Suite Software, Topcon Magnet Office Software, or equivalent. (ITB Line Item 1000166073)

1.3.5.Field Data Collection Software - Carlson SurveCE Software, Topcon Magnet Field Software, or equivalent. (ITB Line Item 1000166072)

1.3.6. Field System Option 1 - Carlson Surveyor+ GNSS System with Surveyor+ Data Collector, Topcon GR-5 GNSS System with FC-250 Data Collector, or equivalent (ITB Line Item 1000141450)

1.3.7. Field System Option 2 - Carlson Super G GNSS System with Carlson Supervisor Tablet Data Collector, Topcon Tesla RTK GNSS System with

Topcon Tesla Data Collector, or equivalent. (ITB Line Item 1000166074)

1.3.8. Field System Option 3 - Carlson BRx5 GNSS System with Carlson Surveyor+ Data Collector, Topcon Hiper V GNSS System with Topcon FC-250 Data Collector, or equivalent (ITB Line Item 1000141452)

1.3.9. Field System Option 4 - Carlson BRx5 GNSS System with Carlson Mini2 Data Collector, Topcon Hiper V GNSS System with Topcon FC-336 Data Collector, or equivalent (ITB Line Item 1000166075)

1.3.10. Maintenance of Data Collector Option 1. (ITB Line Item 1000166076)

1.3.11. Maintenance of Data Collector Option 2. (ITB Line Item 1000166077)

1.3.12. Maintenance of Data Collector Option 3. (ITB Line Item 1000166078)

1.3.13. Maintenance of Office Processing Software. (ITB Line Item 1000166079)

1.3.14. Maintenance of Field Data Collection Software. (ITB Line Item 1000166080)

1.3.15. Maintenance of Field System Option 1 (ITB Line Item 1000166081)

1.3.16. Maintenance of Field System Option 2 (ITB Line Item 1000166082)

1.3.17. Maintenance of Field System Option 3 (ITB Line Item 1000166083)

1.3.18. Maintenance of Field System Option 4 (ITB Line Item 1000166084)

1.3.19. Field System Training (3 Days, 10 Attendees) (ITB Line Item 1000166085)

1.3.20. Field System Follow Up Training (1 Day, 10 Attendees) (ITB Line Item 1000166086)

1.3.21. Office Processing Software Training (5 Days, 10 Attendees) (ITB Line Item 1000166087)

1.3.22. Office Processing Software Follow Up Training (1 Day, 10 Attendees) (ITB Line Item 1000166088)

1.3.23. GNSS Rover Accessory Kit (ITB Line Item 1000166090)

1.3.24. GNSS Baser Accessory Kit (ITB Line Item 1000166089)

2. PROSPECTIVE BIDDERS

2.1. General Requirements

2.2. Manufacturers bidding on this invitation to bid shall provide “off-the-shelf” software solutions for data collection and post processing. If the software products bid in this contract are third party software products, the State of Tennessee will contact the awarded bidder only with issues, problems, etc, and not the third party software vendor. All software products being bid shall not be beta, but officially released products. It is the responsibility of the awarded vendor to resolve any and all issues concerning the “off the shelf” software solutions for the State of Tennessee.

2.3. Manufacturers bidding on this invitation to bid, shall provide “off-the-shelf” hardware solutions for portable GNSS rovers, portable GNSS base stations, and associated peripherals. If the hardware products bid in this contract are third party hardware products, the State of Tennessee will contact the awarded bidder only with issues, problems, etc, and not the third party hardware vendor. It is the responsibility of the awarded vendor to resolve any and all issues concerning the “off-the-shelf” hardware solutions for the State of Tennessee.

2.4. There will be one point of contact to resolve any issues that arise from the contents of this bid, i.e., hardware, software, functionality, etc, and that will be the awarded bidder only, and not third party vendors. If the problems that arise are a result of third party vendor products, then the awarded vender will resolve those issues for the State of Tennessee.

2.5. The State of Tennessee has the option to obtain, at no additional charge, hardware and software upgrades or new product lines that upgrade the functionality of requested products, to any portion of this bid package for 180 calendar days from the bid opening, should the awarded vendor or the awarded vendor’s manufacturer release any new or updated hardware and software products which are publicly released and commercially available within 180 days of the bid opening. The vendor shall provide a replacement hardware or software product that meets or exceeds the specifications of original hardware or software product for any hardware or software that is discontinued for the life of the contract.

2.6. The awarded vendor is responsible for oversight of all repairs, and said vendor must be authorized by the manufacturer to perform both Warranty and Non-Warranty repairs. All repairs will be performed by technicians authorized to perform both Warranty and Non-Warranty repairs.

2.7. The awarded vendor is responsible for providing a factory certified trainer, or equivalent, to perform all training. Each attendee will receive a certificate from the awarded vendor after successful completion of the class. The certificate shall include the dates of the class, the class name, trainer, student, Tennessee

Survey Board class number, PDH's earned, and a certified trainer's statement and signature. The awarded vendor is responsible for submitting all required information to the State of Tennessee Board of Land Surveyors for continuing education official PDH credits, and copies of the approval letters shall be sent to the State of Tennessee.

3. Hardware Technical Requirements

3.1. Data Collector, Field Software, Office software, GNSS Receiver

3.1.1. Data Collector Option 1 - Carlson Surveyor + Data Collector with SurvCE Software, Topcon FC-250 with Magnet Field Software, or equivalent (ITB Line Item 1000158188)

3.1.2. Data Collector Option 2 - Carlson Mini 2 Data Collector with SurvCE Software, Topcon FC-336 with Magnet Field Software, or equivalent (ITB Line Item 1000166070)

3.1.3. Data Collector Option 3 - Carlson Supervisor Data Collector with SurvCE Software, Topcon Tesla with Magnet Field Software, or equivalent (ITB Line Item 1000166071)

3.1.4. Office Processing Software - Carlson Survey GNSS Software and Carlson Civil Suite Software, Topcon Magnet Office Software, or equivalent. (ITB Line Item 1000166073)

3.1.5.Field Data Collection Software - Carlson SurveCE Software, Topcon Magnet Field Software, or equivalent. (ITB Line Item 1000166072)

3.1.6. Field System Option 1 - Carlson Surveyor+ GNSS System with Surveyor+ Data Collector, Topcon GR-5 GNSS System with FC-250 Data Collector, or equivalent (ITB Line Item 1000141450)

3.1.7. Field System Option 2 - Carlson Super G GNSS System with Carlson Supervisor Tablet Data Collector, Topcon Tesla RTK GNSS System with Topcon Tesla Data Collector, or equivalent. (ITB Line Item 1000166074)

3.1.8. Field System Option 3 - Carlson BRx5 GNSS System with Carlson Surveyor+ Data Collector, Topcon Hiper V GNSS System with Topcon FC-250 Data Collector, or equivalent (ITB Line Item 1000141452)

3.1.9. Field System Option 4 - Carlson BRx5 GNSS System with Carlson Mini2 Data Collector, Topcon Hiper V GNSS System with Topcon FC-336 Data Collector, or equivalent (ITB Line Item 1000166075)

3.1.10.Minimum Requirements of Data Collector Options 1-3

3.1.10.1. All modules of Field Software are enabled
3.1.10.2. Ability to send and receive data from/to the office processing software in real-time.
3.1.10.3. Minimum 1 GB of memory
3.1.10.4. All peripheral items required to allow the data collector the ability to connect via cell modem (service provided by TDOT)
3.1.10.5. All peripheral items required to allow the data collector the ability to connect with UHF/SS Radio
3.1.10.6. All cables, peripherals necessary to connect to the existing hardware listed in section 1.1 of this document using cables and via wireless technology
3.1.10.7. One extra battery per data collector
3.1.10.8. External Chargers to charge all batteries

3.1.11.Minimum Requirements of Field Data Collection Software
3.1.11.1. All modules of Field Software are enabled
3.1.11.2. Ability to send and receive data from/to the rover in real-time.

3.1.12.Minimum Requirements of Office Processing Software
3.1.12.1. All modules of Office Software are enabled
3.1.12.2. Ability to send and receive data from/to the rover in real-time.

3.1.13.Minimum Requirements of Field Systems Options 1-5

3.1.13.1. Includes Internal UHF/SS radio for transmit and receiving
3.1.13.2. Includes internal modem
3.1.13.3. Includes standard receiver Options
3.1.13.4. Includes activation of the tracking of all available constellation signals the receiver can track
3.1.13.5. Includes Rover Accessory Kit
3.1.13.6. Minimum 1 GB Memory

3.2. Rover Accessory Kit

3.2.1.Receiver Battery Recharger Cradle
3.2.2.AA Battery Holder for receiver battery
3.2.3.Receiver Quick Disconnect
3.2.4.Rover Rod Bipod
3.2.5.Composite Snap Lock 2 meter Pole

3.3. Base Accessory Kit

3.3.1.Receiver Battery Recharger Cradle
3.3.2.AA Battery Holder for receiver battery
3.3.3.Receiver Quick Disconnect
3.3.4.Cable, Power, Cradle to Receiver
3.3.5.Tripod, 2m Fixed Height with Bag

3.3.6. Rover Rod Bipod
3.3.7. Composite Snap Lock 2 meter Pole

4. General Field System Requirements

4.1. All Field Systems will include an Internal modem and any necessary modem accessories will be provided as a part of this bid. The cost for the internal modem will be included in the overall bid price for the Field Systems. Wireless service for the modem will be provided by the State of Tennessee and the wireless carrier will be made known to the vendor at the time of purchase, so modem receiver configuration can be completed.

4.2. Communications via Bluetooth technology and by cable, or equivalent, between the all components is required.

4.3. If necessary, all applications for the broadcast radio FCC licenses shall be completed by the vendor and forwarded to the State of Tennessee for signatures. Completed applications shall be included with the delivery of each radio.

4.4. All components of the field survey system shall be constructed to withstand the environment common to field surveying.

4.5. All serialized items shall be housed in a carrying case, if this carrying case cannot be used as a shipping container, shipping containers shall be provided in addition to the carrying case.

4.6. The field system shall be battery operated. The battery or batteries shall provide not less than 8.0 hours of normal operation without recharge or without switching batteries. One spare battery for a minimum of 4.0 additional hours of operation and one or more battery chargers, enough to charge all batteries supplied at the same time shall be supplied with the system. The batteries shall be replaced during operation without loss of data.

4.7. Communications via Bluetooth technology, cables and jacks, or equivalent, shall be provided for operation from a standard automobile battery. This communication ability shall operate a minimum of 10 m from the auto battery, utilizing Bluetooth technology, cable connection, or equivalent. If Bluetooth technology or equivalent can be utilized, then cables are not required.

4.8. Antenna/Receiver Requirements

4.8.1. The antenna and the Receiver shall operate, via cable connection or Bluetooth technology, or equivalent, remote from the data collector/ controller at distances up to 10 meters maximum. In addition the vendor shall provide all cables and/or wireless devices necessary for the State of Tennessee to perform Real-Time Kinematic missions in a more portable apparatus, utilizing either portable GNSS base stations or permanently

mounted GNSS reference stations, and using the bid system in either portable GNSS Base or Portable GNSS Rover mode. One 10 meter cable for connecting the data collector/ controller to the antenna/receiver shall be supplied by the vendor for each portable GNSS base and one 10 meter cable for connecting the data collector/ controller to the antenna/receiver each portable GNSS rover, unless communications can be established at the 10 meter distances via Bluetooth technology or equivalent.

4.8.2. The antenna/receiver shall mount on a standard surveying tripod having a 5/8 inch by 11 threads per inch instrument fastener.

4.8.3. The vendor shall provide a means of measuring from a survey ground point to the antenna phase center and to the antenna reference point (ARP). Fixed height tripods/bipods and standard antenna calibrations are an accurate method of measurement.

5. GNSS Office Post - Processing Software Requirements

5.1. The GNSS office post-processing software shall meet or exceed the most current specifications of the current version of the Carlson Survey GNSS Software and Carlson Civil Suite Software or the Topcon Magnet Office Tools + Post Processing software, or equivalent, available from the manufacturer at the time of delivery, and will include all activated options within the software.

6. GNSS Field Data Collection Software Requirements

6.1. The GNSS Field Data Collection software shall meet or exceed the most current specifications of the current version of the Carlson SurveCE software or the Topcon Magnet Field software, or equivalent, available from the manufacturer at the time of delivery, and will include all activated options within the software.

7. Warranty

7.1. The system, including equipment and software, shall be warranted against all defects in materials and workmanship. This warranty applies to all equipment and peripherals, such as radios, tripods, modems, etc. contained within this bid. The warranty shall cover all damages to the equipment and software, as a result of defects in materials and workmanship, and shall not cover abuse.

7.2. The warranty period shall begin upon final acceptance of the delivery by the State and shall be for a minimum duration of one year, or the manufacturer’s standard warranty period, whichever is greater, from the final acceptance of the delivery.

7.2.1. During the warranty period, the repair/replacement of components shall be performed by shipping the equipment to the vendor

7.2.1.1. When the components are shipped, the items shall be shipped to and from the vendor's maintenance site by a one (1) day express delivery service. The awarded vendor shall pay the cost of shipping and shipping insurance to the vendor's maintenance site. The insurance rate shall be determined by the value established through this contract. The vendor shall pay the cost of returning the equipment (shipping and shipping insurance). The State reserves the right to transport the components directly to the repair facility instead of shipping them, however; if components are hand delivered, the State is required to pick up the items from the vendor after repair. The equipment shall be repaired and shipped to the State of Tennessee by the vendor within ten (10) working days of the receipt of the equipment. While the vendor is repairing or diagnosing a repair, the vendor shall provide loaner equipment, during the repair period, of equal or better specifications, at no additional cost to the State of Tennessee. The loaner equipment will be shipped to the State of Tennessee on the next day after the vendor receives the damaged unit in the mail, or by hand delivery.

7.3. Successful bidder shall provide technical support for all the hardware and the computer software bid, during normal working hours, defined as 7:30 AM CST to 5:00 PM CST M-F, excluding State holidays, by manufacturers authorized technical support staff, or equivalent. This support shall be during normal working hours, as defined above, and additional 24 hour assistance shall be available via toll free number, and by internet web page.
Bidding vendor's web address _____ and the toll -free phone number _____ shall be inserted in the provided space above at the time of bid.

7.4. GNSS Office Post Processing Software Technical Support and any hardware technical support shall be provided at no cost to the State of Tennessee via phone, email, or website. Field Technical Support for Portable GNSS Rovers, Portable GNSS base stations, and Portable GIS/GNSS (Mapping-Grade) Receivers shall be provided to previously trained State of Tennessee employees at no additional cost to the State of Tennessee, during the Warranty period.

7.5. The awarded vendor is responsible for oversight of all repairs, and said vendor must be authorized by the manufacturer to perform both Warranty and Non-Warranty repairs. All repairs will be performed by technicians authorized to perform both Warranty and Non-Warranty repairs.

8. Maintenance

8.1. After the expiration of the Warranty period, and for the life of the contract, all components of this bid specification, including equipment and software, shall be covered under a comprehensive maintenance plan that covers equipment parts, labor, and software and hardware upgrades and maintenance releases. The maintenance agreement shall cover all damages to the equipment and software,

as a result of defects in materials and workmanship, and shall not cover abuse.

8.1.1. Software maintenance releases are defined as software that fixes bugs in the current software version, as well as minor enhancements to the current software version.

8.1.2. Software upgrades consist of all enhancements to the software including, but not limited to increasing the functionality of the software.

8.2. The maintenance period shall begin immediately after the warranty period expires and shall run to the end of this contract. The monthly maintenance cost will be based on the number of items purchased on this contract, which are not covered under the warranty. An item cost for each type of maintenance agreement line item will be established, based on a per unit/per month rate.

8.3. During the life of maintenance agreement the equipment period, the repair/replacement of components shall be performed by shipping the equipment to the vendor

8.3.1.1. When the components are shipped, the items shall be shipped to and from the vendor's maintenance site by a one (1) day express delivery service. The State of Tennessee shall pay the cost of shipping and shipping insurance to the vendor's maintenance site. The insurance rate shall be determined by the value established through this contract. The vendor shall pay the cost of returning the equipment to the State of Tennessee (shipping and shipping insurance). The State reserves the right to transport the components directly to the repair facility instead of shipping them, however if components are hand delivered, the State is required to pick up the items form the vendor after repair. The equipment shall be repaired and shipped to the State of Tennessee by the vendor within ten (10) working days of the receipt of the equipment. While the vendor is repairing or diagnosing a repair, the vendor shall provide loaner equipment, during the repair period, of equal or better specifications, at no additional cost to the State of Tennessee. The loaner equipment will be shipped to the State of Tennessee on the next day after the vendor receives the unit in the mail, or by hand delivery.

8.4. Successful bidder shall provide technical support for all the hardware and the computer software bid, during normal working hours, defined as 7:30 AM CST to 5:00 PM CST M-F, excluding State holidays, by manufacturers authorized technical support staff, or equivalent. This support shall be during normal working hours, as defined above, and additional 24 hour assistance shall be available via toll free number, and by internet web page.
Bidding vendor's web address _____ and the toll -free phone number _____ shall be inserted in the provided space above at the time of bid.

8.5. The awarded vendor is responsible for oversight of all repairs, and said vendor must be authorized by the manufacturer to perform both Warranty and Non-Warranty repairs. All repairs will be performed by technicians authorized to

perform both Warranty and Non-Warranty repairs.

9. Manuals

9.1. Technical and user manuals covering all of the items bid in this specification shall be included with the delivery. These manuals shall include at a minimum the following topics: system operation, user operation of system, and user maintenance of system.

9.2. One (1) set of field station manuals shall be supplied with each GNSS Receiver and controller.

9.3. One (1) set of office processing manuals shall be supplied for each Seat of software purchased. These manuals may either be paper copies or via electronic media through software help menus.

10. Training

10.1. On-site Training shall consist of separate courses covering field station training and/or GNSS surveying techniques, and office processing system training

10.2. Training class pre-requisites are listed in the definition of each class type.

10.3. The vendor shall provide all equipment (hardware & software), training materials, training manuals, supplies, and other necessary material. It will be permissible to

use the equipment and manuals delivered under these specifications for training. It is the vendor's responsibility to include their trainer's travel costs; lodging, meals, etc., for the specified number of trainers for each training class in the cost of each class. The State of Tennessee will not reimburse trainers for travel expenses. The State of Tennessee will provide computers for training. The equipment being bid under this specification may be used in all training activities.

10.4. Training manuals will be provided for each class. Training manuals shall be made available to the State of Tennessee staff, at least 2 weeks prior to date of the classes. All printing fees will be included in the cost of the training classes. The awarded vendor will provide enough copies of each manual to satisfy the maximum number of students in each class. The State of Tennessee is free to make as many copies of these manuals, as they deem necessary, without any copyright restrictions from the awarded vendor, for use by State of Tennessee employees. The State of Tennessee has the ability to copy and paste sections from the electronic versions of these manuals for the internal use only of State of Tennessee staff. An electronic copy of each manual will be provided to State of Tennessee in *.doc and *.PDF, Adobe version 10.x or better, format. The State of Tennessee reserves the right to videotape each training session for its future use.

10.5. Both the State of Tennessee and the awarded vendor may make changes to the agendas of any training session, however the change must be agreed upon by both parties. The number of trainers, locations, students, etc. is defined in this section of the specification, and these are considered minimum specifications. Additional topics may be added to the class agenda, if mutually agreed upon.

10.6. Line items will be established for each class as specified. A line item will also be established for one day of training for each type of class, so that if modifications to future class durations are necessary, the State of Tennessee will have that flexibility.

10.7. Field System Training (ITB Line Item No. 1000166085)

10.7.1. Number of people - Maximum of ten (10) as scheduled by the State of Tennessee

10.7.2. Duration of training - twenty-four (24) working hours minimum, maximum of 8 hours per day

10.7.3. Pre-Requisite: None

10.7.4. Number of Trainers Required: 1

10.7.5. Subject Matter:

10.7.5.1. Review of the Global Positioning System.

10.7.5.2. Overview of planning for a satellite survey.

10.7.5.3. Training on the use of field station equipment.

10.7.5.4. Satellite survey field procedures.

10.7.5.5. Overview on the use of the baseline determination routines and other computing routines.

10.7.5.6. Satellite survey errors and factors that affect observation precision.

10.7.5.7. Care and maintenance of equipment.

10.7.5.8. The planning, data collection, baseline determination and coordinate calculations for one actual survey using four field stations.

10.7.5.9. Procedures for the use of Field GNSS equipment with a statewide GNSS network.

10.7.6. Location: In Tennessee as specified by the State of Tennessee

10.8. Field System Follow-Up Training (ITB Line Item No 1000166086)

10.8.1. Number of people - Maximum of ten (10) as scheduled by the State of Tennessee

10.8.2. Duration of training - eight (8) working hours minimum, maximum of 8 hours per day

10.8.3. Pre-Requisite: Field System Training

10.8.4. Number of Trainers Required: 1

10.8.5. Subject Matter:

10.8.5.1. Review of the Global Positioning System.

10.8.5.2. Overview of planning for a satellite survey.

10.8.5.3. Training on the use of field station equipment.

10.8.5.4. Satellite survey field procedures.

10.8.5.5. Overview on the use of the baseline determination routines and other computing routines.

10.8.5.6. Satellite survey errors and factors that affect observation precision.

10.8.5.7. Care and maintenance of equipment.

10.8.5.8. The planning, data collection, baseline determination and coordinate calculations for one actual survey using four field stations.

10.8.5.9. Procedures for the use of Field GNSS equipment with a statewide GNSS network.

10.8.6. Location: In Tennessee as specified by the State of Tennessee

10.9. GNSS Office processing System Training (ITB Line Item No.

1000166087) 10.9.1. Number of people - Maximum of ten (10)

10.9.2. Duration of training - forty (40) working hours minimum, maximum of 8 hours per day

10.9.3. Pre-Requisite: Field System Training

10.9.4. Number of Trainers Required: 1

10.9.5. Subject Matter:

10.9.5.1. Planning a satellite survey (detailed discussion)

10.9.5.2. Training on the use of the baseline determination routines and other provided computing routines.

10.9.5.3. Satellite survey computational procedures, including related Tennessee Coordinate System calculations.

10.9.5.4. Almanac Processing, printing and use.

10.9.5.5. Ephemerides (broadcast and precise) processing, printing and use.

10.9.5.6. Archiving and systems back-ups.

10.9.5.7. Least squares adjustment

10.9.5.8. Statistics and probability

10.9.5.9. Coordinate systems

10.9.5.10. Precision analysis

10.9.5.11. Blunder determination procedures

10.9.5.12. Care and maintenance of the office processing system equipment.

10.9.5.13. Calculation of datum adjustment factors

10.9.6. Location: In Tennessee as specified by the State of Tennessee

10.10. GNSS Office processing System Follow-Up Training (ITB Line Item No. 1000166088)

10.10.1. Number of people - Maximum of ten (10)

10.10.2. Duration of training - eight (8) working hours minimum, maximum of 8 hours per day

10.10.3. Pre-Requisite: GNSS Office processing System Training

10.10.4. Number of Trainers Required: 1

10.10.5. Subject Matter:

10.10.5.1. Planning a satellite survey (detailed discussion)

10.10.5.2. Training on the use of the baseline determination routines and other provided computing routines.

10.10.5.3. Satellite survey computational procedures, including related Tennessee Coordinate System calculations.

10.10.5.4. Almanac Processing, printing and use.

10.10.5.5. Ephemerides (broadcast and precise) processing, printing and use.

10.10.5.6. Archiving and systems back-ups.

10.10.5.7. Least squares adjustment

10.10.5.8. Statistics and probability

10.10.5.9. Coordinate systems

10.10.5.10. Precision analysis

10.10.5.11. Blunder determination procedures

10.10.5.12. Care and maintenance of the office processing system equipment.

10.10.5.13. Calculation of datum adjustment factors

10.10.6. Location: In Tennessee as specified by the State of Tennessee

10.11. Miscellaneous Training Items

10.11.1. A factory certified trainer, or equivalent, shall perform all training. Each attendee will receive a certificate from the awarded vendor after successful completion of the class. The certificate shall include the dates of the class, the class name, trainer, student, Tennessee Survey Board class number, PDH's earned, and a certified trainer's statement and signature.

10.11.2. All training classes will be submitted by the awarded vendor to the State of Tennessee Board of Land Surveyors for continuing education official PDH credits, and copies of the approval letters shall be sent to the State of Tennessee.

10.11.3. Training shall be scheduled by the State of Tennessee staff and the vendor's representatives as necessary. The date of the training classes may be adjusted or rescheduled by the State of Tennessee, as necessary, with 48 hours advance notice to the awarded vendor.

11. Delivery

11.1. Delivery shall not be considered complete until purchased Items have been received and are fully operational, and approved by the State of Tennessee. Payment will be issued in phases as purchase orders are processed and approved by the State of Tennessee staff. As the items of a purchase order are approved by State personnel, then payment will be rendered on those items.

11.2. Delivery of all equipment and software will be coordinated through the State agency placing the order, and delivered anywhere throughout the State of Tennessee as directed by the State of Tennessee.

11.3. The software shall be installed anywhere throughout the State of Tennessee by State of Tennessee staff. The State of Tennessee staff will be trained by the vendor on the installation of all types of software provided, so that the State of Tennessee staff will be able to install the software anywhere throughout the State of Tennessee. The vendor will be required to provide assistance to the State of Tennessee staff installing software, at no additional cost, if required.

11.4. Delivery shall be made within approximately thirty (30) days after receiving order.